

SEQUENCE LISTING

<110> MIDOH, Naoki
 OKAKURA, Kaoru
 MIYAMOTO, Koichi
 WATANABE, Manabu
 YANAI, Koji
 YASUTAKE, Tetsuya
 AIHARA, Sato
 FUTAMURA, Takafumi
 KLEINKAUF, Horst
 MURAKAMI, Takeshi

<120> Cyclic Depsipeptide Synthetase And Gene Thereof, And Mass Production System For Cyclic Depsipeptide

<130> 2002-0317A/LC/00144

<140> 10/070,387

<141> 2002-03-06

<150> JP 253040/1999

<151> 1999-09-07

<150> JP 104291/2000

<151> 2000-04-06

<160> 21

<170> PatentIn Ver. 2.1

<210> 1

<211> 9633

<212> DNA

<213> Mycelia sterilia

<220>

<221> CDS

<222> (1)..(9633)

<223> peptide synthetase for PF1022

<220>

<221> mat_peptide

<222> (13)..(9630)

<400> 1

atg	tca	aac	atg	gca	cca	ctc	cct	acg	atg	ggc	gtt	gag	cag	caa	gcc	48
Met	Ser	Asn	Met	Ala	Pro	Leu	Pro	Thr	Met	Gly	Val	Glu	Gln	Gln	Ala	
		-1		1				5					10			

cta	tca	ctt	tca	tgc	ccc	tta	ctc	cct	cat	gac	gat	gag	aaa	cac	tca	96
Leu	Ser	Leu	Ser	Cys	Pro	Leu	Leu	Pro	His	Asp	Asp	Glu	Lys	His	Ser	
		15					20					25				

gac	aac	ctt	tac	gag	caa	gca	act	cgg	cac	ttc	ggc	ttg	agc	cga	gac	144
Asp	Asn	Leu	Tyr	Glu	Gln	Ala	Thr	Arg	His	Phe	Gly	Leu	Ser	Arg	Asp	
		30				35					40					

aag atc gaa aat gtc tta cca tgt act tcc ttt caa tgt gat gtc ata	192
Lys Ile Glu Asn Val Leu Pro Cys Thr Ser Phe Gln Cys Asp Val Ile	
45 50 55 60	
gat tgc gcc gtc gac gat cgg cgg cat gct atc ggt cac gtc gtc tat	240
Asp Cys Ala Val Asp Asp Arg Arg His Ala Ile Gly His Val Val Tyr	
65 70 75	
gat atc ccc aat aca gtg gac atc cag cgt tta gcc gca gcc tgg aaa	288
Asp Ile Pro Asn Thr Val Asp Ile Gln Arg Leu Ala Ala Ala Trp Lys	
80 85 90	
gag gtt gtg cgg cag aca cca atc ttg agg acc ggc atc ttt aca tca	336
Glu Val Val Arg Gln Thr Pro Ile Leu Arg Thr Gly Ile Phe Thr Ser	
95 100 105	
gaa acc ggc gac tct ttt cag atc gtc ttg aaa gaa ggc tgc cta ccg	384
Glu Thr Gly Asp Ser Phe Gln Ile Val Leu Lys Glu Gly Cys Leu Pro	
110 115 120	
tgg atg tac gcg aca tgt ctc ggc atg aag ggg gca gtg ata caa gat	432
Trp Met Tyr Ala Thr Cys Leu Gly Met Lys Gly Ala Val Ile Gln Asp	
125 130 135 140	
gaa gca gtc gcc gct atg act gga ccg cgt tgc aat cga tat gtc gtc	480
Glu Ala Val Ala Ala Met Thr Gly Pro Arg Cys Asn Arg Tyr Val Val	
145 150 155	
ctg gag gac ccg agt acg aag caa agg ctg ctc atc tgg aca ttc agc	528
Leu Glu Asp Pro Ser Thr Lys Gln Arg Leu Leu Ile Trp Thr Phe Ser	
160 165 170	
cat gct tta gtg gat tat aca gtc cag gaa cgc atc ctt cag cgg gtt	576
His Ala Leu Val Asp Tyr Thr Val Gln Glu Arg Ile Leu Gln Arg Val	
175 180 185	
ctc aca gta tac gac ggc cgg gac gtc gag tgc cct cgc atc aag gat	624
Leu Thr Val Tyr Asp Gly Arg Asp Val Glu Cys Pro Arg Ile Lys Asp	
190 195 200	
aca gaa cat gtc tct cgg ttt tgg caa caa cac ttt gaa ggc tta gat	672
Thr Glu His Val Ser Arg Phe Trp Gln Gln His Phe Glu Gly Leu Asp	
205 210 215 220	
gcc tcc gta ttt ccc ctt cta cca tct cac cta act gtg tgc aat ccc	720
Ala Ser Val Phe Pro Leu Leu Pro Ser His Leu Thr Val Cys Asn Pro	
225 230 235	
aat gcg cgc gca gaa cat cat atc tca tac acg gga cca gtc cag agg	768
Asn Ala Arg Ala Glu His His Ile Ser Tyr Thr Gly Pro Val Gln Arg	
240 245 250	
aag tgg tcc cat aca agt atc tgt cgg gct gca ctc gca gtt ctt cta	816
Lys Trp Ser His Thr Ser Ile Cys Arg Ala Ala Leu Ala Val Leu Leu	
255 260 265	
tct cgc ttt aca cac tct tcg gag gcc ctc ttc ggt gtt gtg aca gaa	864

Ser	Arg	Phe	Thr	His	Ser	Ser	Glu	Ala	Leu	Phe	Gly	Val	Val	Thr	Glu		
270						275					280						
caa	tct	cac	aac	tcc	gag	gac	caa	aga	cgg	tca	att	gat	ggc	ccc	gca	912	
Gln	Ser	His	Asn	Ser	Glu	Asp	Gln	Arg	Arg	Ser	Ile	Asp	Gly	Pro	Ala		
285					290					295					300		
agg	aca	gta	gtg	cct	atc	cgc	gtc	ctt	tgt	gcc	cca	gat	caa	tat	gtg	960	
Arg	Thr	Val	Val	Pro	Ile	Arg	Val	Leu	Cys	Ala	Pro	Asp	Gln	Tyr	Val		
				305					310					315			
tcg	gat	gtc	att	ggg	gca	atc	acc	gca	cac	gaa	cac	gcc	atg	cgc	ggg	1008	
Ser	Asp	Val	Ile	Gly	Ala	Ile	Thr	Ala	His	Glu	His	Ala	Met	Arg	Gly		
			320					325					330				
ttt	gag	cac	gct	gga	ctt	cgc	aat	atc	cgc	cgt	acc	gga	gac	gac	ggg	1056	
Phe	Glu	His	Ala	Gly	Leu	Arg	Asn	Ile	Arg	Arg	Thr	Gly	Asp	Asp	Gly		
		335					340					345					
tct	gct	gct	tgt	gga	ttc	cag	acc	gtg	cta	ctg	gtg	act	gac	ggg	gat	1104	
Ser	Ala	Ala	Cys	Gly	Phe	Gln	Thr	Val	Leu	Leu	Val	Thr	Asp	Gly	Asp		
		350				355					360						
gct	ccc	aag	acc	cct	ggg	agt	gta	ctt	cat	cga	agt	gta	gaa	gaa	tcg	1152	
Ala	Pro	Lys	Thr	Pro	Gly	Ser	Val	Leu	His	Arg	Ser	Val	Glu	Glu	Ser		
365					370					375					380		
gat	aga	ttc	atg	ccc	tgc	gct	aat	cgt	gcc	ctt	ctg	ctc	gac	tgc	cag	1200	
Asp	Arg	Phe	Met	Pro	Cys	Ala	Asn	Arg	Ala	Leu	Leu	Leu	Asp	Cys	Gln		
				385					390					395			
atg	gct	ggc	aac	tcg	gca	tcc	cta	gtc	gca	cga	tat	gat	cat	aat	gtg	1248	
Met	Ala	Gly	Asn	Ser	Ala	Ser	Leu	Val	Ala	Arg	Tyr	Asp	His	Asn	Val		
			400					405					410				
atc	gac	cca	cgc	cag	atg	tct	cgc	ttc	ctg	cga	cag	cta	gga	tac	ctg	1296	
Ile	Asp	Pro	Arg	Gln	Met	Ser	Arg	Phe	Leu	Arg	Gln	Leu	Gly	Tyr	Leu		
		415					420					425					
atc	caa	caa	ttt	cat	cat	cac	gtc	gat	ctg	cct	ctg	gtc	aaa	gaa	ctg	1344	
Ile	Gln	Gln	Phe	His	His	His	Val	Asp	Leu	Pro	Leu	Val	Lys	Glu	Leu		
			430			435					440						
gac	gtc	gtg	acg	gcg	gag	gat	tgt	gcg	gaa	atc	gag	aaa	tgg	aat	tca	1392	
Asp	Val	Val	Thr	Ala	Glu	Asp	Cys	Ala	Glu	Ile	Glu	Lys	Trp	Asn	Ser		
445					450					455					460		
gaa	cgc	cta	aca	atg	caa	gac	gcc	tta	atc	cac	gac	acc	ata	tcc	aag	1440	
Glu	Arg	Leu	Thr	Met	Gln	Asp	Ala	Leu	Ile	His	Asp	Thr	Ile	Ser	Lys		
				465				470						475			
tgg	gct	gct	ggc	gat	ccc	aac	aaa	gct	gca	gtt	ttc	gct	tgg	gat	ggg	1488	
Trp	Ala	Ala	Gly	Asp	Pro	Asn	Lys	Ala	Ala	Val	Phe	Ala	Trp	Asp	Gly		
			480					485					490				
gaa	tgg	aca	tac	gcc	gag	cta	gac	aac	ata	tcc	tcc	cgt	ctc	gcc	gtg	1536	
Glu	Trp	Thr	Tyr	Ala	Glu	Leu	Asp	Asn	Ile	Ser	Ser	Arg	Leu	Ala	Val		

495						500						505						
tat	atc	caa	tcc	ctg	gac	ttg	aga	cca	gga	caa	gca	ata	ctc	cca	ctc	1584		
Tyr	Ile	Gln	Ser	Leu	Asp	Leu	Arg	Pro	Gly	Gln	Ala	Ile	Leu	Pro	Leu			
	510					515					520							
tgc	ttc	gag	aag	tca	aaa	tgg	gtc	gtc	gcc	aca	att	ctc	gcc	gtc	ctc	1632		
Cys	Phe	Glu	Lys	Ser	Lys	Trp	Val	Val	Ala	Thr	Ile	Leu	Ala	Val	Leu			
525					530					535					540			
aaa	gtc	ggt	cgg	gca	ttc	aca	ctc	atc	gac	ccg	tgc	gac	ccc	tcg	gca	1680		
Lys	Val	Gly	Arg	Ala	Phe	Thr	Leu	Ile	Asp	Pro	Cys	Asp	Pro	Ser	Ala			
				545					550					555				
agg	atg	gcc	cag	gtc	tgt	cag	cag	acc	tcc	gcc	aca	gtc	gct	ctc	acc	1728		
Arg	Met	Ala	Gln	Val	Cys	Gln	Gln	Thr	Ser	Ala	Thr	Val	Ala	Leu	Thr			
			560					565					570					
tcc	aaa	ctc	cac	aac	acc	acc	tta	cgt	tcc	gtc	gtt	tcc	cgc	tgc	att	1776		
Ser	Lys	Leu	His	Asn	Thr	Thr	Leu	Arg	Ser	Val	Val	Ser	Arg	Cys	Ile			
		575					580					585						
gtg	gtc	gac	gac	gac	ctc	ctt	cgg	tcc	tta	ccc	cac	gcc	gat	ggc	cgc	1824		
Val	Val	Asp	Asp	Asp	Leu	Leu	Arg	Ser	Leu	Pro	His	Ala	Asp	Gly	Arg			
	590					595					600							
tta	aag	gcc	acc	gtg	aag	cca	cag	gac	ttg	gcc	tat	gtt	att	ttc	aca	1872		
Leu	Lys	Ala	Thr	Val	Lys	Pro	Gln	Asp	Leu	Ala	Tyr	Val	Ile	Phe	Thr			
605					610					615					620			
tct	ggc	agc	aca	gga	gag	ccg	aaa	ggc	atc	atg	atc	gaa	cat	cgg	ggg	1920		
Ser	Gly	Ser	Thr	Gly	Glu	Pro	Lys	Gly	Ile	Met	Ile	Glu	His	Arg	Gly			
				625					630					635				
ttc	gtg	tcg	tgt	gct	atg	aaa	ttt	ggc	ccc	gcg	ctc	gga	atg	gat	gag	1968		
Phe	Val	Ser	Cys	Ala	Met	Lys	Phe	Gly	Pro	Ala	Leu	Gly	Met	Asp	Glu			
			640					645					650					
cac	acg	cgc	gct	ctt	caa	ttc	gcc	tca	tat	gcg	ttt	ggc	gct	tgt	ctg	2016		
His	Thr	Arg	Ala	Leu	Gln	Phe	Ala	Ser	Tyr	Ala	Phe	Gly	Ala	Cys	Leu			
			655				660					665						
gta	gaa	gtt	gtg	aca	gct	ctg	atg	cac	ggc	ggc	tgc	gtc	tgc	atc	cct	2064		
Val	Glu	Val	Val	Thr	Ala	Leu	Met	His	Gly	Gly	Cys	Val	Cys	Ile	Pro			
	670					675					680							
tcc	gat	gac	gat	cgc	ttg	aac	aat	gta	ccg	gag	ttc	atc	aaa	agg	gcc	2112		
Ser	Asp	Asp	Asp	Arg	Leu	Asn	Asn	Val	Pro	Glu	Phe	Ile	Lys	Arg	Ala			
685					690					695					700			
cag	gtg	aac	tgg	gtg	ata	ctc	act	ccg	tcg	tat	atc	ggg	aca	ttc	cag	2160		
Gln	Val	Asn	Trp	Val	Ile	Leu	Thr	Pro	Ser	Tyr	Ile	Gly	Thr	Phe	Gln			
				705					710					715				
ccg	gaa	gat	gtc	cct	gga	cta	caa	aca	ctg	gta	ttg	gtt	gga	gaa	cct	2208		
Pro	Glu	Asp	Val	Pro	Gly	Leu	Gln	Thr	Leu	Val	Leu	Val	Gly	Glu	Pro			
			720					725					730					

atc tca gcg tct att cgg gat acc tgg gcc tcc cag gtt cga ctc ctg Ile Ser Ala Ser Ile Arg Asp Thr Trp Ala Ser Gln Val Arg Leu Leu 735 740 745	2256
aat gcc tac ggt cag agt gaa agc tca act atg tgc agc gtc acg gaa Asn Ala Tyr Gly Gln Ser Glu Ser Ser Thr Met Cys Ser Val Thr Glu 750 755 760	2304
gtc agc ccg ctc tcc ctc gaa ccg aac aat atc ggt cgg gct gta ggc Val Ser Pro Leu Ser Leu Glu Pro Asn Asn Ile Gly Arg Ala Val Gly 765 770 775 780	2352
gca cga tcc tgg atc att gat ccc gac gag cct gat cgt ctt gct cca Ala Arg Ser Trp Ile Ile Asp Pro Asp Glu Pro Asp Arg Leu Ala Pro 785 790 795	2400
att ggc tgc att gga gag cta gtg atc gaa agt ccg ggc att gcg cgc Ile Gly Cys Ile Gly Glu Leu Val Ile Glu Ser Pro Gly Ile Ala Arg 800 805 810	2448
gac tat atc atc gcg ccg ccg ccg gac aag tcc ccc ttt ctc cta gca Asp Tyr Ile Ile Ala Pro Pro Pro Asp Lys Ser Pro Phe Leu Leu Ala 815 820 825	2496
ccc ccg gcc tgg tat cca gcc ggg aaa tta tcc aac gcc ttt aaa ttt Pro Pro Ala Trp Tyr Pro Ala Gly Lys Leu Ser Asn Ala Phe Lys Phe 830 835 840	2544
tac aag act gga gat ctc gtg cgt tat gga cct gac ggc acc atc gtc Tyr Lys Thr Gly Asp Leu Val Arg Tyr Gly Pro Asp Gly Thr Ile Val 845 850 855 860	2592
tgc ctg gga cgc aaa gat tgc caa gtg aag atc cga ggg cag cgc gta Cys Leu Gly Arg Lys Asp Ser Gln Val Lys Ile Arg Gly Gln Arg Val 865 870 875	2640
gag atc agc gca gtg gaa gcc agt cta cga cga caa cta cct agt gac Glu Ile Ser Ala Val Glu Ala Ser Leu Arg Arg Gln Leu Pro Ser Asp 880 885 890	2688
atc atg ccc gtg gcc gaa gct atc aaa cgc tgc gat tgc tca ggc agc Ile Met Pro Val Ala Glu Ala Ile Lys Arg Ser Asp Ser Ser Gly Ser 895 900 905	2736
aca gtc ttg act gcc ttc ttg ata ggg tca tct aag agc gga gat ggt Thr Val Leu Thr Ala Phe Leu Ile Gly Ser Ser Lys Ser Gly Asp Gly 910 915 920	2784
aat ggc cac gct tta tct gcg gca gac gcc gtt atc ttg gat cac ggt Asn Gly His Ala Leu Ser Ala Ala Asp Ala Val Ile Leu Asp His Gly 925 930 935 940	2832
gct acc aac gag ata aac gcg aag ttg cag caa atc ctt ccc cag cat Ala Thr Asn Glu Ile Asn Ala Lys Leu Gln Gln Ile Leu Pro Gln His 945 950 955	2880
tcc gtt cca tcc tat tat atc cac atg gaa aat ctt cct cga act gcc	2928

Ser	Val	Pro	Ser	Tyr	Tyr	Ile	His	Met	Glu	Asn	Leu	Pro	Arg	Thr	Ala		
			960					965					970				
acc	ggc	aaa	gcg	gac	agg	aaa	atg	ctt	cga	tct	att	gct	agc	aag	cta	2976	
Thr	Gly	Lys	Ala	Asp	Arg	Lys	Met	Leu	Arg	Ser	Ile	Ala	Ser	Lys	Leu		
		975					980					985					
ttg	ggt	gaa	ttg	tct	cag	aac	gtg	aca	tct	caa	ccg	att	gag	aag	cac	3024	
Leu	Gly	Glu	Leu	Ser	Gln	Asn	Val	Thr	Ser	Gln	Pro	Ile	Glu	Lys	His		
	990					995					1000						
gat	gcc	cca	gca	act	ggt	ata	gag	gtc	aag	ctg	aag	gag	ctt	tgg	ttt	3072	
Asp	Ala	Pro	Ala	Thr	Gly	Ile	Glu	Val	Lys	Leu	Lys	Glu	Leu	Trp	Phe		
1005					1010					1015					1020		
ctg	agc	ttg	aat	ctt	aat	ccc	aac	tct	caa	gat	gtc	gga	gcg	agt	ttc	3120	
Leu	Ser	Leu	Asn	Leu	Asn	Pro	Asn	Ser	Gln	Asp	Val	Gly	Ala	Ser	Phe		
			1025						1030					1035			
ttt	gac	tta	ggc	gga	aat	tcc	att	atc	gcc	atc	aaa	atg	gta	aac	atg	3168	
Phe	Asp	Leu	Gly	Gly	Asn	Ser	Ile	Ile	Ala	Ile	Lys	Met	Val	Asn	Met		
		1040						1045					1050				
gcg	agg	tca	gct	ggg	ata	gca	ctg	aag	gta	tcc	gac	ata	ttc	cag	aat	3216	
Ala	Arg	Ser	Ala	Gly	Ile	Ala	Leu	Lys	Val	Ser	Asp	Ile	Phe	Gln	Asn		
	1055						1060					1065					
ccc	acg	ctc	gcc	ggc	ctt	gtg	gat	gtc	atc	ggg	cga	gac	ccg	gct	ccg	3264	
Pro	Thr	Leu	Ala	Gly	Leu	Val	Asp	Val	Ile	Gly	Arg	Asp	Pro	Ala	Pro		
	1070					1075					1080						
tac	aac	ctc	atc	cca	aca	aca	gca	tac	agc	gga	cct	gtt	gag	cag	tcg	3312	
Tyr	Asn	Leu	Ile	Pro	Thr	Thr	Ala	Tyr	Ser	Gly	Pro	Val	Glu	Gln	Ser		
1085					1090					1095					1100		
ttc	gcc	cag	ggc	cgt	cta	tgg	ttc	ttg	gac	cag	atc	gaa	ctc	gat	gcg	3360	
Phe	Ala	Gln	Gly	Arg	Leu	Trp	Phe	Leu	Asp	Gln	Ile	Glu	Leu	Asp	Ala		
			1105						1110					1115			
ttg	tgg	tac	ctt	cta	cca	tac	gcc	gtt	cgc	atg	cgc	ggg	cca	ttg	cat	3408	
Leu	Trp	Tyr	Leu	Leu	Pro	Tyr	Ala	Val	Arg	Met	Arg	Gly	Pro	Leu	His		
			1120					1125					1130				
att	gat	gcg	ctc	act	att	gcg	ttg	cta	gct	ata	cag	caa	cga	cat	gaa	3456	
Ile	Asp	Ala	Leu	Thr	Ile	Ala	Leu	Leu	Ala	Ile	Gln	Gln	Arg	His	Glu		
		1135					1140					1145					
acc	ttg	cgg	aca	acc	ttt	gag	gag	cag	gac	ggc	gta	ggc	gtt	cag	gtt	3504	
Thr	Leu	Arg	Thr	Thr	Phe	Glu	Glu	Gln	Asp	Gly	Val	Gly	Val	Gln	Val		
	1150					1155					1160						
gtc	cat	gcg	agc	ccc	atc	tcc	gac	ttg	agg	ata	atc	gac	gta	tca	ggc	3552	
Val	His	Ala	Ser	Pro	Ile	Ser	Asp	Leu	Arg	Ile	Ile	Asp	Val	Ser	Gly		
1165					1170					1175					1180		
gac	cga	aac	agt	gac	tac	ctc	cag	ttg	cta	cac	caa	gag	cag	acg	act	3600	
Asp	Arg	Asn	Ser	Asp	Tyr	Leu	Gln	Leu	Leu	His	Gln	Glu	Gln	Thr	Thr		

1185	1190	1195	
cca ttc att cta gca tgt cag gca gga tgg agg gta tca ctg att aga Pro Phe Ile Leu Ala Cys Gln Ala Gly Trp Arg Val Ser Leu Ile Arg 1200 1205 1210			3648
cta gga gaa gat gat cac atc ctc tct atc gta atg cat cac atc atc Leu Gly Glu Asp Asp His Ile Leu Ser Ile Val Met His His Ile Ile 1215 1220 1225			3696
tcc gac ggc tgg tct atc gac att cta cgc cgg gaa cta agc aat ttc Ser Asp Gly Trp Ser Ile Asp Ile Leu Arg Arg Glu Leu Ser Asn Phe 1230 1235 1240			3744
tat tca gcc gct ctc cgg ggc tct gat cct cta tcg gtg gtg agc cca Tyr Ser Ala Ala Leu Arg Gly Ser Asp Pro Leu Ser Val Val Ser Pro 1245 1250 1255 1260			3792
ctc cca ctc cac tac cgc gac ttt tcc gtt tgg caa aag cag gtc gaa Leu Pro Leu His Tyr Arg Asp Phe Ser Val Trp Gln Lys Gln Val Glu 1265 1270 1275			3840
cag gag acc gaa cat gag cgg caa ctc gaa tac tgg gtc aag cag ctc Gln Glu Thr Glu His Glu Arg Gln Leu Glu Tyr Trp Val Lys Gln Leu 1280 1285 1290			3888
gca gac agc tcg gcc gcc gaa ttc cta acc gac ttc ccc cga ccc aac Ala Asp Ser Ser Ala Ala Glu Phe Leu Thr Asp Phe Pro Arg Pro Asn 1295 1300 1305			3936
ata ctg tcc ggt gaa gca ggt tcc gtg cca gtg acg atc gaa ggc gaa Ile Leu Ser Gly Glu Ala Gly Ser Val Pro Val Thr Ile Glu Gly Glu 1310 1315 1320			3984
ctg tat gaa agg ctc caa gaa ttc tgt aaa gta gag caa atg acg cct Leu Tyr Glu Arg Leu Gln Glu Phe Cys Lys Val Glu Gln Met Thr Pro 1325 1330 1335 1340			4032
ttc gcc gtg ttg tta ggg gcc ttc cgc gcg acc cat tat cgt ctc acc Phe Ala Val Leu Leu Gly Ala Phe Arg Ala Thr His Tyr Arg Leu Thr 1345 1350 1355			4080
ggc gcc gaa gac tcg atc atc ggc acg ccc atc gcg aac cgc aac cgc Gly Ala Glu Asp Ser Ile Ile Gly Thr Pro Ile Ala Asn Arg Asn Arg 1360 1365 1370			4128
cag gag ctt gaa aac atg atc ggc ttc ttc gtc aac acc caa tgc atg Gln Glu Leu Glu Asn Met Ile Gly Phe Phe Val Asn Thr Gln Cys Met 1375 1380 1385			4176
cga atc acg gtc gac ggc gac gac act ttt gaa agc ctg gtg cga caa Arg Ile Thr Val Asp Gly Asp Asp Thr Phe Glu Ser Leu Val Arg Gln 1390 1395 1400			4224
gtt cgg acc acg gcg acg gcg gca ttc gag cac caa gac gtc ccc ttt Val Arg Thr Thr Ala Thr Ala Ala Phe Glu His Gln Asp Val Pro Phe 1405 1410 1415 1420			4272

gag cgc gtc gtg acg gca ctc ctt cca cgc tcg aga gac cta tcc cga	4320
Glu Arg Val Val Thr Ala Leu Leu Pro Arg Ser Arg Asp Leu Ser Arg	
1425 1430 1435	
aac cca cta gca cag ctc acc ttc gct ctt cat tct caa cag gac ctc	4368
Asn Pro Leu Ala Gln Leu Thr Phe Ala Leu His Ser Gln Gln Asp Leu	
1440 1445 1450	
ggc aag ttc gag ctg gag ggt ctc gta gcg gaa ccc gtc tcg aac aag	4416
Gly Lys Phe Glu Leu Glu Gly Leu Val Ala Glu Pro Val Ser Asn Lys	
1455 1460 1465	
gta tac acc agg ttc gac gtg gag ttt cac ctg ttc caa gaa gcc gga	4464
Val Tyr Thr Arg Phe Asp Val Glu Phe His Leu Phe Gln Glu Ala Gly	
1470 1475 1480	
aga cta agc ggt aac gtg gca ttt gcg gca gat cta ttc aag cct gag	4512
Arg Leu Ser Gly Asn Val Ala Phe Ala Ala Asp Leu Phe Lys Pro Glu	
1485 1490 1495 1500	
acc att agc aat gta gtc gcc ata ttt ttc caa atc ctg cga caa ggc	4560
Thr Ile Ser Asn Val Val Ala Ile Phe Phe Gln Ile Leu Arg Gln Gly	
1505 1510 1515	
att cgc cag cct cgg act cca atc gct gtt ctc ccg ctt acc gat ggg	4608
Ile Arg Gln Pro Arg Thr Pro Ile Ala Val Leu Pro Leu Thr Asp Gly	
1520 1525 1530	
tta gcg gac ctt cgt gcc atg ggc ttg ctt gag atc gag aag gca gaa	4656
Leu Ala Asp Leu Arg Ala Met Gly Leu Leu Glu Ile Glu Lys Ala Glu	
1535 1540 1545	
tac ccg cgg gag tcg agc gtc gtc gac gtc ttc cgc aag cag gtg gcc	4704
Tyr Pro Arg Glu Ser Ser Val Val Asp Val Phe Arg Lys Gln Val Ala	
1550 1555 1560	
gct cac ccg cac gct ttt gcc gtt gtc gat tcg gca tcg cgc ctc aca	4752
Ala His Pro His Ala Phe Ala Val Val Asp Ser Ala Ser Arg Leu Thr	
1565 1570 1575 1580	
tat gct gat ctc gat cgt caa tcc gat caa ctc gcg acc tgg ctc ggt	4800
Tyr Ala Asp Leu Asp Arg Gln Ser Asp Gln Leu Ala Thr Trp Leu Gly	
1585 1590 1595	
cgg cgc aat atg acg gct gag acg ctg gtc ggg gtg tta gca ccg cgg	4848
Arg Arg Asn Met Thr Ala Glu Thr Leu Val Gly Val Leu Ala Pro Arg	
1600 1605 1610	
tca tgt caa aca gtt gtt gcc att tta ggt atc ctg aaa gcg aat ctc	4896
Ser Cys Gln Thr Val Val Ala Ile Leu Gly Ile Leu Lys Ala Asn Leu	
1615 1620 1625	
gca tat ctc ccg ctt gat gtg aat tgt cct acc gcc cgc ctg caa aca	4944
Ala Tyr Leu Pro Leu Asp Val Asn Cys Pro Thr Ala Arg Leu Gln Thr	
1630 1635 1640	
atc cta tct aca ttg aat cgg cac aag ttg gtc cta ctc ggc tct aac	4992

Ile 1645	Leu	Ser	Thr	Leu	Asn 1650	Arg	His	Lys	Leu	Val 1655	Leu	Leu	Gly	Ser	Asn 1660	
gca Ala	act Thr	act Thr	ccg Pro	gat Asp	gtc Val	cag Gln	ata Ile	cct Pro	gat Asp	gta Val	gag Glu	ctg Leu	gta Val	cga Arg	atc Ile	5040
			1665					1670					1675			
agc Ser	gat Asp	atc Ile	tta Leu	gat Asp	cgc Arg	ccc Pro	atc Ile	aat Asn	ggc Gly	cag Gln	gca Ala	aag Lys	cta Leu	aat Asn	ggt Gly	5088
			1680					1685					1690			
cat His	aca Thr	aaa Lys	tcg Ser	aat Asn	ggc Gly	tac Tyr	tca Ser	aag Lys	cca Pro	aac Asn	ggc Gly	tat Tyr	acg Thr	cat His	ctg Leu	5136
		1695					1700					1705				
aaa Lys	ggc Gly	tat Tyr	tca Ser	aac Asn	cta Leu	aac Asn	ggt Gly	tat Tyr	tca Ser	aaa Lys	caa Gln	aat Asn	ggt Gly	tat Tyr	gca Ala	5184
		1710				1715					1720					
caa Gln	ctc Leu	aac Asn	ggc Gly	cat His	aga Arg	gag Glu	cgt Arg	aac Asn	aat Asn	tat Tyr	tta Leu	gat Asp	cta Leu	aat Asn	ggg Gly	5232
					1730					1735					1740	
cac His	tca Ser	ctg Leu	cta Leu	aat Asn	ggg Gly	aat Asn	tca Ser	gac Asp	atc Ile	acc Thr	aca Thr	tca Ser	ggg Gly	ccc Pro	tca Ser	5280
				1745				1750						1755		
gca Ala	aca Thr	agc Ser	ctt Leu	gcc Ala	tac Tyr	gtg Val	atc Ile	ttc Phe	aca Thr	tcc Ser	ggc Gly	tca Ser	acc Thr	gga Gly	aag Lys	5328
			1760					1765					1770			
ccc Pro	aaa Lys	gga Gly	gtc Val	atg Met	gtc Val	gaa Glu	cac His	cgc Arg	agc Ser	atc Ile	atc Ile	cga Arg	ctt Leu	gca Ala	aag Lys	5376
		1775					1780					1785				
aag Lys	aac Asn	aga Arg	atc Ile	ata Ile	tcc Ser	agg Arg	ttc Phe	cca Pro	tct Ser	gta Val	gcc Ala	aag Lys	gta Val	gct Ala	cac His	5424
		1790				1795				1800						
ctc Leu	tca Ser	aac Asn	atc Ile	gcc Ala	ttt Phe	gac Asp	gcc Ala	gcc Ala	act Thr	tgg Trp	gaa Glu	atg Met	ttc Phe	gca Ala	gcc Ala	5472
					1810					1815					1820	
ctt Leu	cta Leu	aac Asn	ggc Gly	gga Gly	acg Thr	ctg Leu	gtc Val	tgt Cys	atc Ile	gac Asp	tat Tyr	atg Met	acc Thr	acc Thr	ctg Leu	5520
				1825				1830					1835			
gac Asp	agc Ser	aaa Lys	acg Thr	ctc Leu	gag Glu	gcc Ala	gcg Ala	ttt Phe	gca Ala	cga Arg	gaa Glu	caa Gln	atc Ile	aac Asn	gcc Ala	5568
			1840				1845						1850			
gcg Ala	tta Leu	ctc Leu	acg Thr	ccc Pro	gct Ala	ttg Leu	ttg Leu	aag Lys	cag Gln	tgc Cys	cta Leu	gcc Ala	aac Asn	att Ile	ccc Pro	5616
		1855				1860					1865					
act Thr	acc Thr	cta Leu	ggc Gly	agg Arg	ctg Leu	agt Ser	gca Ala	ctc Leu	gtt Val	att Ile	gga Gly	ggt Gly	gat Asp	agg Arg	ctt Leu	5664

1870	1875	1880	
gac ggc caa gac gcg atc gca gca cat gcg ctt gtc ggt gct ggc gtg Asp Gly Gln Asp Ala Ile Ala Ala His Ala Leu Val Gly Ala Gly Val 1885 1890 1895 1900			5712
tat aat gcg tat ggc ccg acc gaa aac gga gtg atc agt acg att tat Tyr Asn Ala Tyr Gly Pro Thr Glu Asn Gly Val Ile Ser Thr Ile Tyr 1905 1910 1915			5760
aat atc act aaa aac gac tcg ttc atc aac gga gtc ccc atc ggc tgt Asn Ile Thr Lys Asn Asp Ser Phe Ile Asn Gly Val Pro Ile Gly Cys 1920 1925 1930			5808
gca atc agc aat tcc ggc gcc tac atc aca gac cca gac cag cag ctc Ala Ile Ser Asn Ser Gly Ala Tyr Ile Thr Asp Pro Asp Gln Gln Leu 1935 1940 1945			5856
gta cct cct ggc gtc atg ggt gaa ctc gtc gtt acc ggt gac ggg ctc Val Pro Pro Gly Val Met Gly Glu Leu Val Val Thr Gly Asp Gly Leu 1950 1955 1960			5904
gcg cgg ggg tat aca gac cca gca cta gac gcg ggc cgc ttc gtc cag Ala Arg Gly Tyr Thr Asp Pro Ala Leu Asp Ala Gly Arg Phe Val Gln 1965 1970 1975 1980			5952
atc atg atc aat gac aag gcc gtg agg gcg tac cga acg ggt gac cgg Ile Met Ile Asn Asp Lys Ala Val Arg Ala Tyr Arg Thr Gly Asp Arg 1985 1990 1995			6000
gca cga tat cgc gta gga gac ggt cag atc gag ttc ttc gga cgc atg Ala Arg Tyr Arg Val Gly Asp Gly Gln Ile Glu Phe Phe Gly Arg Met 2000 2005 2010			6048
gat cag caa gtc aag atc cga ggt cac cgc att gaa cca gcc gaa gtg Asp Gln Gln Val Lys Ile Arg Gly His Arg Ile Glu Pro Ala Glu Val 2015 2020 2025			6096
gag cgt gct att ctc gac caa gac tcg gcc cgc gac gcc gtc gtt gtc Glu Arg Ala Ile Leu Asp Gln Asp Ser Ala Arg Asp Ala Val Val Val 2030 2035 2040			6144
atc cgg cac caa gaa ggt gaa gaa ccg gag atg gtt ggt ttc gtc gcg Ile Arg His Gln Glu Gly Glu Glu Pro Glu Met Val Gly Phe Val Ala 2045 2050 2055 2060			6192
acc cac ggc gat cac tct gcc gaa caa gag gaa gca gac gac cag gtt Thr His Gly Asp His Ser Ala Glu Gln Glu Glu Ala Asp Asp Gln Val 2065 2070 2075			6240
gaa ggt tgg aaa gac ttc ttc gag agc aat aca tat gcc gac atg gat Glu Gly Trp Lys Asp Phe Phe Glu Ser Asn Thr Tyr Ala Asp Met Asp 2080 2085 2090			6288
acc atc ggc cag tct gct ata ggc aac gac ttt acg ggc tgg acg tcc Thr Ile Gly Gln Ser Ala Ile Gly Asn Asp Phe Thr Gly Trp Thr Ser 2095 2100 2105			6336

atg tac gac ggg agc gag atc aac aag gcc gag atg cag gag tgg ctc Met Tyr Asp Gly Ser Glu Ile Asn Lys Ala Glu Met Gln Glu Trp Leu 2110 2115 2120	6384
gac gac acc atg cgc aca ctc ctc gat ggc caa gcg ccg ggt cac gta Asp Asp Thr Met Arg Thr Leu Leu Asp Gly Gln Ala Pro Gly His Val 2125 2130 2135 2140	6432
ctc gaa ata ggc aca ggc agt ggc atg gta ttg ttt aac tta ggg gcc Leu Glu Ile Gly Thr Gly Ser Gly Met Val Leu Phe Asn Leu Gly Ala 2145 2150 2155	6480
ggg cta caa agc tac gta ggt ctt gaa cca tct aga tct gca gcc acg Gly Leu Gln Ser Tyr Val Gly Leu Glu Pro Ser Arg Ser Ala Ala Thr 2160 2165 2170	6528
ttt gtt acc aaa gcg atc aat tcc acc cca gct ctt gca gga aag gcc Phe Val Thr Lys Ala Ile Asn Ser Thr Pro Ala Leu Ala Gly Lys Ala 2175 2180 2185	6576
gaa gtg cac gtc ggc aca gcg aca gac ata aac cga ctt cgt gga ctt Glu Val His Val Gly Thr Ala Thr Asp Ile Asn Arg Leu Arg Gly Leu 2190 2195 2200	6624
cgt ccc gat cta gtt gtg ctc aac tcg gta gtc cag tat ttc ccc acg Arg Pro Asp Leu Val Val Leu Asn Ser Val Val Gln Tyr Phe Pro Thr 2205 2210 2215 2220	6672
ccc gag tac cta cta gag gtc gtg gag agt ctc gtc cgg att ccg ggc Pro Glu Tyr Leu Leu Glu Val Val Glu Ser Leu Val Arg Ile Pro Gly 2225 2230 2235	6720
gtc aag cgc gtg gtc ttc ggc gac ata cga tct cac gcc acg aac aga Val Lys Arg Val Val Phe Gly Asp Ile Arg Ser His Ala Thr Asn Arg 2240 2245 2250	6768
cat ttt ctt gct gcc agg gcg ctg cat tcg ctg ggc tcc aag gcg acc His Phe Leu Ala Ala Arg Ala Leu His Ser Leu Gly Ser Lys Ala Thr 2255 2260 2265	6816
aaa gat gct ata cgt caa aag atg acg gag atg gaa gag cgc gag gaa Lys Asp Ala Ile Arg Gln Lys Met Thr Glu Met Glu Glu Arg Glu Glu 2270 2275 2280	6864
gag ctg ctc gtc gac ccg gcc ttc ttc acg gcg ctg ctg cag ggc cag Glu Leu Leu Val Asp Pro Ala Phe Phe Thr Ala Leu Leu Gln Gly Gln 2285 2290 2295 2300	6912
ctt gcc gat cga atc aag cac gtc gag atc ctc ccg aag aac atg cgc Leu Ala Asp Arg Ile Lys His Val Glu Ile Leu Pro Lys Asn Met Arg 2305 2310 2315	6960
gcc acg aac gag ctg agc gcg tac cgg tat aca gcc gtc att cac gta Ala Thr Asn Glu Leu Ser Ala Tyr Arg Tyr Thr Ala Val Ile His Val 2320 2325 2330	7008
cgc ggc cca gag gaa cag tcg cgg ccc gtg tat ccg atc caa gtg aac	7056

Arg Gly Pro Glu Glu Gln Ser Arg Pro Val Tyr Pro Ile Gln Val Asn	
2335 2340 2345	
gac tgg atc gac ttt cag gcc tca cgc att gac cgc cgc gcc ctt ctc	7104
Asp Trp Ile Asp Phe Gln Ala Ser Arg Ile Asp Arg Arg Ala Leu Leu	
2350 2355 2360	
cga ctc cta cag cgc tcg gca gac gcc gcg acc gtc gcc gtc agc aac	7152
Arg Leu Leu Gln Arg Ser Ala Asp Ala Ala Thr Val Ala Val Ser Asn	
2365 2370 2375 2380	
atc ccc tac agc aag acg att gta gaa cgc cat gtc gtc gag tcc ctt	7200
Ile Pro Tyr Ser Lys Thr Ile Val Glu Arg His Val Val Glu Ser Leu	
2385 2390 2395	
gac aat aac aac agg gag aat acg cat aga gca cca gac ggc gcg gct	7248
Asp Asn Asn Asn Arg Glu Asn Thr His Arg Ala Pro Asp Gly Ala Ala	
2400 2405 2410	
tgg atc tcg gcc gtc cgc tcc aag gcc gag cgc tgc acg tcc ctc tcc	7296
Trp Ile Ser Ala Val Arg Ser Lys Ala Glu Arg Cys Thr Ser Leu Ser	
2415 2420 2425	
gtg acc gat ctt gtg cag ctc ggg gaa gaa gcc ggc ttt cgc gta gaa	7344
Val Thr Asp Leu Val Gln Leu Gly Glu Glu Ala Gly Phe Arg Val Glu	
2430 2435 2440	
gtc agc gca gcg cgg cag tgg tct caa agc ggc gcg ctc gat gcc gtc	7392
Val Ser Ala Ala Arg Gln Trp Ser Gln Ser Gly Ala Leu Asp Ala Val	
2445 2450 2455 2460	
ttt cac cgc tat aat ttg ccc act caa agc aat agt cgc gtt ctg att	7440
Phe His Arg Tyr Asn Leu Pro Thr Gln Ser Asn Ser Arg Val Leu Ile	
2465 2470 2475	
cag ttc cct acc gaa gat ggc cag acg cga aga tcc gcc act ctg aca	7488
Gln Phe Pro Thr Glu Asp Gly Gln Thr Arg Arg Ser Ala Thr Leu Thr	
2480 2485 2490	
aac cga cca cta cag cgt ctg cag agc cgt cgg ttc gca tca cag atc	7536
Asn Arg Pro Leu Gln Arg Leu Gln Ser Arg Arg Phe Ala Ser Gln Ile	
2495 2500 2505	
cgc gaa cag ctg aag gcc gtg ctc ccg tca tac atg atc ccc tcc cgc	7584
Arg Glu Gln Leu Lys Ala Val Leu Pro Ser Tyr Met Ile Pro Ser Arg	
2510 2515 2520	
atc gtg gtc ata gac cag atg cct ctc aat gcc aat ggc aag gtc gac	7632
Ile Val Val Ile Asp Gln Met Pro Leu Asn Ala Asn Gly Lys Val Asp	
2525 2530 2535 2540	
cgg aaa gaa ctt acc aga agg gcc caa atc gcg ccg aaa tct cag gcg	7680
Arg Lys Glu Leu Thr Arg Arg Ala Gln Ile Ala Pro Lys Ser Gln Ala	
2545 2550 2555	
gct ccc gcc aaa ccc gtc aaa cag gtc gat ccg ttc gtc aac ctg gaa	7728
Ala Pro Ala Lys Pro Val Lys Gln Val Asp Pro Phe Val Asn Leu Glu	

2560	2565	2570	
gcc att tta tgt gag gag ttc gcg gag gtg ctg ggc atg gaa gtc ggc Ala Ile Leu Cys Glu Glu Phe Ala Glu Val Leu Gly Met Glu Val Gly 2575 2580 2585			7776
gtg aac gac cac ttc ttc caa cta ggc gga cac tct ctc ttg gcc acg Val Asn Asp His Phe Phe Gln Leu Gly Gly His Ser Leu Leu Ala Thr 2590 2595 2600			7824
aag ctc gtc gcg cgt ctc agt cgt cgg cta aac ggt cgt gtg tct gtg Lys Leu Val Ala Arg Leu Ser Arg Arg Leu Asn Gly Arg Val Ser Val 2605 2610 2615 2620			7872
agg gat gtg ttc gac cag cct gtg att tcc gac ctc gca gtc acc ctc Arg Asp Val Phe Asp Gln Pro Val Ile Ser Asp Leu Ala Val Thr Leu 2625 2630 2635			7920
cgc cag gga ctg acc ttg gaa aac gcc att ccc gca acg ccg gac agc Arg Gln Gly Leu Thr Leu Glu Asn Ala Ile Pro Ala Thr Pro Asp Ser 2640 2645 2650			7968
ggg tat tgg gag cag aca atg tcc gca ccg aca acc ccg agc gac gac Gly Tyr Trp Glu Gln Thr Met Ser Ala Pro Thr Thr Pro Ser Asp Asp 2655 2660 2665			8016
atg gag gcc gtg cta tgc aag gag ttt gcg gat gtg ctt ggc gtc gaa Met Glu Ala Val Leu Cys Lys Glu Phe Ala Asp Val Leu Gly Val Glu 2670 2675 2680			8064
gtc agc gcc acc gac agc ttc ttc gat ctc ggt ggg cat tcc ctc atg Val Ser Ala Thr Asp Ser Phe Phe Asp Leu Gly Gly His Ser Leu Met 2685 2690 2695 2700			8112
gct acg aag ctc gct gcg cgt att agc cgt cgg cta gat gta ccg gtg Ala Thr Lys Leu Ala Ala Arg Ile Ser Arg Arg Leu Asp Val Pro Val 2705 2710 2715			8160
tca atc aaa gac ata ttc gat cac tca gtt cct cta aac ctt gcg agg Ser Ile Lys Asp Ile Phe Asp His Ser Val Pro Leu Asn Leu Ala Arg 2720 2725 2730			8208
aag att cgg ctc act caa gca aaa ggc cac gaa gcg acc aat gga gta Lys Ile Arg Leu Thr Gln Ala Lys Gly His Glu Ala Thr Asn Gly Val 2735 2740 2745			8256
caa atc gcc aac gac gcc cca ttc caa ctc att tcc gta gaa gat cca Gln Ile Ala Asn Asp Ala Pro Phe Gln Leu Ile Ser Val Glu Asp Pro 2750 2755 2760			8304
gag ata ttc gtc caa cgt gaa atc gcc cct caa cta caa tgc tca ccc Glu Ile Phe Val Gln Arg Glu Ile Ala Pro Gln Leu Gln Cys Ser Pro 2765 2770 2775 2780			8352
gag aca atc cta gac gtc tac ccc gcc acg caa atg caa agg gtc ttc Glu Thr Ile Leu Asp Val Tyr Pro Ala Thr Gln Met Gln Arg Val Phe 2785 2790 2795			8400

ctc ctc aac cca gta aca gga aag ccg cgc tca cca acg cca ttt cac	8448
Leu Leu Asn Pro Val Thr Gly Lys Pro Arg Ser Pro Thr Pro Phe His	
2800 2805 2810	
ata gac ttc ccg ccg gac gca gac tgc gcc agc ctg atg cgg gca tgt	8496
Ile Asp Phe Pro Pro Asp Ala Asp Cys Ala Ser Leu Met Arg Ala Cys	
2815 2820 2825	
gca tct cta gcg aag cat ttc gat atc ttc agg acg gtg ttc ctc gaa	8544
Ala Ser Leu Ala Lys His Phe Asp Ile Phe Arg Thr Val Phe Leu Glu	
2830 2835 2840	
gcc aga ggc gaa ctc tac caa gta gtt cta aaa cac gtc gac gtg ccc	8592
Ala Arg Gly Glu Leu Tyr Gln Val Val Leu Lys His Val Asp Val Pro	
2845 2850 2855 2860	
atc gag atg ctc cag acc gaa gaa aac atc aac agc gcg acc cgg tcg	8640
Ile Glu Met Leu Gln Thr Glu Glu Asn Ile Asn Ser Ala Thr Arg Ser	
2865 2870 2875	
ttc ctg gac gta gac gca gaa aaa ccc atc cgg cta ggc cag cca ctg	8688
Phe Leu Asp Val Asp Ala Glu Lys Pro Ile Arg Leu Gly Gln Pro Leu	
2880 2885 2890	
atc cgc atc gcg ata cta gag aag ccc ggg tcc acg ctg cgc gtc atc	8736
Ile Arg Ile Ala Ile Leu Glu Lys Pro Gly Ser Thr Leu Arg Val Ile	
2895 2900 2905	
cta cga tta tcc cac gcc tta tac gac ggc ctg agc cta gag cac atc	8784
Leu Arg Leu Ser His Ala Leu Tyr Asp Gly Leu Ser Leu Glu His Ile	
2910 2915 2920	
ctg cac tct ctg cac atc ctc ttt ttc ggc ggc agt ctt ccc ccg ccg	8832
Leu His Ser Leu His Ile Leu Phe Phe Gly Gly Ser Leu Pro Pro Pro	
2925 2930 2935 2940	
ccc aag ttc gcc ggg tac atg caa cac gtc gcg agc agt cgc aga gaa	8880
Pro Lys Phe Ala Gly Tyr Met Gln His Val Ala Ser Ser Arg Arg Glu	
2945 2950 2955	
ggc tac gat ttc tgg cgt tcc gtt ctc cga gat tcg tct atg aca gtc	8928
Gly Tyr Asp Phe Trp Arg Ser Val Leu Arg Asp Ser Ser Met Thr Val	
2960 2965 2970	
atc aaa ggc aac aat aat aca act cca cca cct cct cct caa caa caa	8976
Ile Lys Gly Asn Asn Asn Thr Thr Pro Pro Pro Pro Pro Gln Gln Gln	
2975 2980 2985	
tcc acc ccc tcc gga gcc cac cac gcc tcc aaa gta gtc act atc cca	9024
Ser Thr Pro Ser Gly Ala His His Ala Ser Lys Val Val Thr Ile Pro	
2990 2995 3000	
acc caa gcc aac aca gac agc cgg atc acg cgc gcc acg atc ttc act	9072
Thr Gln Ala Asn Thr Asp Ser Arg Ile Thr Arg Ala Thr Ile Phe Thr	
3005 3010 3015 3020	
acc gct tgc gca cta atg ctc gcg aaa gaa gac aac tcc agc gac gtc	9120

Thr	Ala	Cys	Ala	Leu	Met	Leu	Ala	Lys	Glu	Asp	Asn	Ser	Ser	Asp	Val	
				3025					3030					3035		
gtc	ttc	ggg	cgt	acg	gta	tcg	ggg	cgt	caa	ggc	ctg	ccc	cta	gcc	cac	9168
Val	Phe	Gly	Arg	Thr	Val	Ser	Gly	Arg	Gln	Gly	Leu	Pro	Leu	Ala	His	
			3040					3045					3050			
caa	aac	gtg	atc	gga	cca	tgt	ctc	aac	caa	gtg	ccc	gtg	cgc	gcg	cgc	9216
Gln	Asn	Val	Ile	Gly	Pro	Cys	Leu	Asn	Gln	Val	Pro	Val	Arg	Ala	Arg	
		3055					3060					3065				
ggt	tta	aac	cga	gga	acc	act	cac	cac	cga	gaa	ctt	ctc	cgc	gag	atg	9264
Gly	Leu	Asn	Arg	Gly	Thr	Thr	His	His	Arg	Glu	Leu	Leu	Arg	Glu	Met	
	3070					3075					3080					
caa	gag	caa	tat	ctc	aac	agt	ctc	gct	ttc	gaa	act	ctc	ggg	tac	gac	9312
Gln	Glu	Gln	Tyr	Leu	Asn	Ser	Leu	Ala	Phe	Glu	Thr	Leu	Gly	Tyr	Asp	
	3085				3090					3095					3100	
gag	atc	aag	gcg	cac	tgc	aca	gac	tgg	ccg	gac	gtg	cca	gcg	acc	gcg	9360
Glu	Ile	Lys	Ala	His	Cys	Thr	Asp	Trp	Pro	Asp	Val	Pro	Ala	Thr	Ala	
			3105					3110					3115			
agc	ttc	ggg	tgc	tgc	atc	gtg	tac	cag	aac	ttc	gat	tcg	cac	ccg	gac	9408
Ser	Phe	Gly	Cys	Cys	Ile	Val	Tyr	Gln	Asn	Phe	Asp	Ser	His	Pro	Asp	
		3120					3125					3130				
agc	cga	gtc	gaa	gag	cag	cgg	ctg	cag	atc	ggg	gtc	ttg	tcg	cgg	aac	9456
Ser	Arg	Val	Glu	Glu	Gln	Arg	Leu	Gln	Ile	Gly	Val	Leu	Ser	Arg	Asn	
		3135				3140					3145					
tac	gag	gct	att	aat	gag	ggg	ctc	gtg	cat	gat	ctt	gtt	att	gct	ggg	9504
Tyr	Glu	Ala	Ile	Asn	Glu	Gly	Leu	Val	His	Asp	Leu	Val	Ile	Ala	Gly	
	3150					3155				3160						
gag	tcg	gag	cct	gat	ggg	gat	gat	ttg	agg	gtt	act	gtt	gtg	gcg	aat	9552
Glu	Ser	Glu	Pro	Asp	Gly	Asp	Asp	Leu	Arg	Val	Thr	Val	Val	Ala	Asn	
	3165				3170				3175					3180		
cgg	agg	ttg	tgc	gat	gag	gaa	agg	ttg	aag	agg	atg	ctg	gag	gag	ctg	9600
Arg	Arg	Leu	Cys	Asp	Glu	Glu	Arg	Leu	Lys	Arg	Met	Leu	Glu	Glu	Leu	
			3185				3190					3195				
tgt	ggg	aat	att	cgg	gct	ttg	gcg	ttg	gtt	tag						9633
Cys	Gly	Asn	Ile	Arg	Ala	Leu	Ala	Leu	Val							
		3200				3205										
<210> 2																
<211> 3210																
<212> PRT																
<213> Mycelia sterilia																
<400> 2																
Met	Ser	Asn	Met	Ala	Pro	Leu	Pro	Thr	Met	Gly	Val	Glu	Gln	Gln	Ala	
1				5					10					15		

Leu	Ser	Leu	Ser	Cys	Pro	Leu	Leu	Pro	His	Asp	Asp	Glu	Lys	His	Ser		
			20					25					30				
Asp	Asn	Leu	Tyr	Glu	Gln	Ala	Thr	Arg	His	Phe	Gly	Leu	Ser	Arg	Asp		
		35					40					45					
Lys	Ile	Glu	Asn	Val	Leu	Pro	Cys	Thr	Ser	Phe	Gln	Cys	Asp	Val	Ile		
	50					55					60						
Asp	Cys	Ala	Val	Asp	Asp	Arg	Arg	His	Ala	Ile	Gly	His	Val	Val	Tyr		
65					70					75					80		
Asp	Ile	Pro	Asn	Thr	Val	Asp	Ile	Gln	Arg	Leu	Ala	Ala	Ala	Trp	Lys		
				85					90					95			
Glu	Val	Val	Arg	Gln	Thr	Pro	Ile	Leu	Arg	Thr	Gly	Ile	Phe	Thr	Ser		
			100					105					110				
Glu	Thr	Gly	Asp	Ser	Phe	Gln	Ile	Val	Leu	Lys	Glu	Gly	Cys	Leu	Pro		
		115					120					125					
Trp	Met	Tyr	Ala	Thr	Cys	Leu	Gly	Met	Lys	Gly	Ala	Val	Ile	Gln	Asp		
	130					135					140						
Glu	Ala	Val	Ala	Ala	Met	Thr	Gly	Pro	Arg	Cys	Asn	Arg	Tyr	Val	Val		
145					150					155					160		
Leu	Glu	Asp	Pro	Ser	Thr	Lys	Gln	Arg	Leu	Leu	Ile	Trp	Thr	Phe	Ser		
				165					170					175			
His	Ala	Leu	Val	Asp	Tyr	Thr	Val	Gln	Glu	Arg	Ile	Leu	Gln	Arg	Val		
			180					185					190				
Leu	Thr	Val	Tyr	Asp	Gly	Arg	Asp	Val	Glu	Cys	Pro	Arg	Ile	Lys	Asp		
		195					200					205					
Thr	Glu	His	Val	Ser	Arg	Phe	Trp	Gln	Gln	His	Phe	Glu	Gly	Leu	Asp		
	210					215					220						
Ala	Ser	Val	Phe	Pro	Leu	Leu	Pro	Ser	His	Leu	Thr	Val	Cys	Asn	Pro		
225					230					235					240		
Asn	Ala	Arg	Ala	Glu	His	His	Ile	Ser	Tyr	Thr	Gly	Pro	Val	Gln	Arg		
				245					250					255			
Lys	Trp	Ser	His	Thr	Ser	Ile	Cys	Arg	Ala	Ala	Leu	Ala	Val	Leu	Leu		
			260					265					270				
Ser	Arg	Phe	Thr	His	Ser	Ser	Glu	Ala	Leu	Phe	Gly	Val	Val	Thr	Glu		
		275					280					285					
Gln	Ser	His	Asn	Ser	Glu	Asp	Gln	Arg	Arg	Ser	Ile	Asp	Gly	Pro	Ala		
	290					295					300						
Arg	Thr	Val	Val	Pro	Ile	Arg	Val	Leu	Cys	Ala	Pro	Asp	Gln	Tyr	Val		
305					310					315					320		

Ser	Asp	Val	Ile	Gly	Ala	Ile	Thr	Ala	His	Glu	His	Ala	Met	Arg	Gly	325	330	335
Phe	Glu	His	Ala	Gly	Leu	Arg	Asn	Ile	Arg	Arg	Thr	Gly	Asp	Asp	Gly	340	345	350
Ser	Ala	Ala	Cys	Gly	Phe	Gln	Thr	Val	Leu	Leu	Val	Thr	Asp	Gly	Asp	355	360	365
Ala	Pro	Lys	Thr	Pro	Gly	Ser	Val	Leu	His	Arg	Ser	Val	Glu	Glu	Ser	370	375	380
Asp	Arg	Phe	Met	Pro	Cys	Ala	Asn	Arg	Ala	Leu	Leu	Leu	Asp	Cys	Gln	385	390	395
Met	Ala	Gly	Asn	Ser	Ala	Ser	Leu	Val	Ala	Arg	Tyr	Asp	His	Asn	Val	405	410	415
Ile	Asp	Pro	Arg	Gln	Met	Ser	Arg	Phe	Leu	Arg	Gln	Leu	Gly	Tyr	Leu	420	425	430
Ile	Gln	Gln	Phe	His	His	His	Val	Asp	Leu	Pro	Leu	Val	Lys	Glu	Leu	435	440	445
Asp	Val	Val	Thr	Ala	Glu	Asp	Cys	Ala	Glu	Ile	Glu	Lys	Trp	Asn	Ser	450	455	460
Glu	Arg	Leu	Thr	Met	Gln	Asp	Ala	Leu	Ile	His	Asp	Thr	Ile	Ser	Lys	465	470	475
Trp	Ala	Ala	Gly	Asp	Pro	Asn	Lys	Ala	Ala	Val	Phe	Ala	Trp	Asp	Gly	485	490	495
Glu	Trp	Thr	Tyr	Ala	Glu	Leu	Asp	Asn	Ile	Ser	Ser	Arg	Leu	Ala	Val	500	505	510
Tyr	Ile	Gln	Ser	Leu	Asp	Leu	Arg	Pro	Gly	Gln	Ala	Ile	Leu	Pro	Leu	515	520	525
Cys	Phe	Glu	Lys	Ser	Lys	Trp	Val	Val	Ala	Thr	Ile	Leu	Ala	Val	Leu	530	535	540
Lys	Val	Gly	Arg	Ala	Phe	Thr	Leu	Ile	Asp	Pro	Cys	Asp	Pro	Ser	Ala	545	550	555
Arg	Met	Ala	Gln	Val	Cys	Gln	Gln	Thr	Ser	Ala	Thr	Val	Ala	Leu	Thr	565	570	575
Ser	Lys	Leu	His	Asn	Thr	Thr	Leu	Arg	Ser	Val	Val	Ser	Arg	Cys	Ile	580	585	590
Val	Val	Asp	Asp	Asp	Leu	Leu	Arg	Ser	Leu	Pro	His	Ala	Asp	Gly	Arg	595	600	605
Leu	Lys	Ala	Thr	Val	Lys	Pro	Gln	Asp	Leu	Ala	Tyr	Val	Ile	Phe	Thr	610	615	620

Ser	Gly	Ser	Thr	Gly	Glu	Pro	Lys	Gly	Ile	Met	Ile	Glu	His	Arg	Gly	625	630	635	640
Phe	Val	Ser	Cys	Ala	Met	Lys	Phe	Gly	Pro	Ala	Leu	Gly	Met	Asp	Glu	645	650	655	
His	Thr	Arg	Ala	Leu	Gln	Phe	Ala	Ser	Tyr	Ala	Phe	Gly	Ala	Cys	Leu	660	665	670	
Val	Glu	Val	Val	Thr	Ala	Leu	Met	His	Gly	Gly	Cys	Val	Cys	Ile	Pro	675	680	685	
Ser	Asp	Asp	Asp	Arg	Leu	Asn	Asn	Val	Pro	Glu	Phe	Ile	Lys	Arg	Ala	690	695	700	
Gln	Val	Asn	Trp	Val	Ile	Leu	Thr	Pro	Ser	Tyr	Ile	Gly	Thr	Phe	Gln	705	710	715	720
Pro	Glu	Asp	Val	Pro	Gly	Leu	Gln	Thr	Leu	Val	Leu	Val	Gly	Glu	Pro	725	730	735	
Ile	Ser	Ala	Ser	Ile	Arg	Asp	Thr	Trp	Ala	Ser	Gln	Val	Arg	Leu	Leu	740	745	750	
Asn	Ala	Tyr	Gly	Gln	Ser	Glu	Ser	Ser	Thr	Met	Cys	Ser	Val	Thr	Glu	755	760	765	
Val	Ser	Pro	Leu	Ser	Leu	Glu	Pro	Asn	Asn	Ile	Gly	Arg	Ala	Val	Gly	770	775	780	
Ala	Arg	Ser	Trp	Ile	Ile	Asp	Pro	Asp	Glu	Pro	Asp	Arg	Leu	Ala	Pro	785	790	795	800
Ile	Gly	Cys	Ile	Gly	Glu	Leu	Val	Ile	Glu	Ser	Pro	Gly	Ile	Ala	Arg	805	810	815	
Asp	Tyr	Ile	Ile	Ala	Pro	Pro	Pro	Asp	Lys	Ser	Pro	Phe	Leu	Leu	Ala	820	825	830	
Pro	Pro	Ala	Trp	Tyr	Pro	Ala	Gly	Lys	Leu	Ser	Asn	Ala	Phe	Lys	Phe	835	840	845	
Tyr	Lys	Thr	Gly	Asp	Leu	Val	Arg	Tyr	Gly	Pro	Asp	Gly	Thr	Ile	Val	850	855	860	
Cys	Leu	Gly	Arg	Lys	Asp	Ser	Gln	Val	Lys	Ile	Arg	Gly	Gln	Arg	Val	865	870	875	880
Glu	Ile	Ser	Ala	Val	Glu	Ala	Ser	Leu	Arg	Arg	Gln	Leu	Pro	Ser	Asp	885	890	895	
Ile	Met	Pro	Val	Ala	Glu	Ala	Ile	Lys	Arg	Ser	Asp	Ser	Ser	Gly	Ser	900	905	910	
Thr	Val	Leu	Thr	Ala	Phe	Leu	Ile	Gly	Ser	Ser	Lys	Ser	Gly	Asp	Gly	915	920	925	

Asn Gly His Ala Leu Ser Ala Ala Asp Ala Val Ile Leu Asp His Gly
 930 935 940
 Ala Thr Asn Glu Ile Asn Ala Lys Leu Gln Gln Ile Leu Pro Gln His
 945 950 955 960
 Ser Val Pro Ser Tyr Tyr Ile His Met Glu Asn Leu Pro Arg Thr Ala
 965 970 975
 Thr Gly Lys Ala Asp Arg Lys Met Leu Arg Ser Ile Ala Ser Lys Leu
 980 985 990
 Leu Gly Glu Leu Ser Gln Asn Val Thr Ser Gln Pro Ile Glu Lys His
 995 1000 1005
 Asp Ala Pro Ala Thr Gly Ile Glu Val Lys Leu Lys Glu Leu Trp Phe
 1010 1015 1020
 Leu Ser Leu Asn Leu Asn Pro Asn Ser Gln Asp Val Gly Ala Ser Phe
 1025 1030 1035 1040
 Phe Asp Leu Gly Gly Asn Ser Ile Ile Ala Ile Lys Met Val Asn Met
 1045 1050 1055
 Ala Arg Ser Ala Gly Ile Ala Leu Lys Val Ser Asp Ile Phe Gln Asn
 1060 1065 1070
 Pro Thr Leu Ala Gly Leu Val Asp Val Ile Gly Arg Asp Pro Ala Pro
 1075 1080 1085
 Tyr Asn Leu Ile Pro Thr Thr Ala Tyr Ser Gly Pro Val Glu Gln Ser
 1090 1095 1100
 Phe Ala Gln Gly Arg Leu Trp Phe Leu Asp Gln Ile Glu Leu Asp Ala
 1105 1110 1115 1120
 Leu Trp Tyr Leu Leu Pro Tyr Ala Val Arg Met Arg Gly Pro Leu His
 1125 1130 1135
 Ile Asp Ala Leu Thr Ile Ala Leu Leu Ala Ile Gln Gln Arg His Glu
 1140 1145 1150
 Thr Leu Arg Thr Thr Phe Glu Glu Gln Asp Gly Val Gly Val Gln Val
 1155 1160 1165
 Val His Ala Ser Pro Ile Ser Asp Leu Arg Ile Ile Asp Val Ser Gly
 1170 1175 1180
 Asp Arg Asn Ser Asp Tyr Leu Gln Leu Leu His Gln Glu Gln Thr Thr
 1185 1190 1195 1200
 Pro Phe Ile Leu Ala Cys Gln Ala Gly Trp Arg Val Ser Leu Ile Arg
 1205 1210 1215
 Leu Gly Glu Asp Asp His Ile Leu Ser Ile Val Met His His Ile Ile
 1220 1225 1230

Ser Asp Gly Trp Ser Ile Asp Ile Leu Arg Arg Glu Leu Ser Asn Phe
 1235 1240 1245
 Tyr Ser Ala Ala Leu Arg Gly Ser Asp Pro Leu Ser Val Val Ser Pro
 1250 1255 1260
 Leu Pro Leu His Tyr Arg Asp Phe Ser Val Trp Gln Lys Gln Val Glu
 1265 1270 1275 1280
 Gln Glu Thr Glu His Glu Arg Gln Leu Glu Tyr Trp Val Lys Gln Leu
 1285 1290 1295
 Ala Asp Ser Ser Ala Ala Glu Phe Leu Thr Asp Phe Pro Arg Pro Asn
 1300 1305 1310
 Ile Leu Ser Gly Glu Ala Gly Ser Val Pro Val Thr Ile Glu Gly Glu
 1315 1320 1325
 Leu Tyr Glu Arg Leu Gln Glu Phe Cys Lys Val Glu Gln Met Thr Pro
 1330 1335 1340
 Phe Ala Val Leu Leu Gly Ala Phe Arg Ala Thr His Tyr Arg Leu Thr
 1345 1350 1355 1360
 Gly Ala Glu Asp Ser Ile Ile Gly Thr Pro Ile Ala Asn Arg Asn Arg
 1365 1370 1375
 Gln Glu Leu Glu Asn Met Ile Gly Phe Phe Val Asn Thr Gln Cys Met
 1380 1385 1390
 Arg Ile Thr Val Asp Gly Asp Asp Thr Phe Glu Ser Leu Val Arg Gln
 1395 1400 1405
 Val Arg Thr Thr Ala Thr Ala Ala Phe Glu His Gln Asp Val Pro Phe
 1410 1415 1420
 Glu Arg Val Val Thr Ala Leu Leu Pro Arg Ser Arg Asp Leu Ser Arg
 1425 1430 1435 1440
 Asn Pro Leu Ala Gln Leu Thr Phe Ala Leu His Ser Gln Gln Asp Leu
 1445 1450 1455
 Gly Lys Phe Glu Leu Glu Gly Leu Val Ala Glu Pro Val Ser Asn Lys
 1460 1465 1470
 Val Tyr Thr Arg Phe Asp Val Glu Phe His Leu Phe Gln Glu Ala Gly
 1475 1480 1485
 Arg Leu Ser Gly Asn Val Ala Phe Ala Ala Asp Leu Phe Lys Pro Glu
 1490 1495 1500
 Thr Ile Ser Asn Val Val Ala Ile Phe Phe Gln Ile Leu Arg Gln Gly
 1505 1510 1515 1520
 Ile Arg Gln Pro Arg Thr Pro Ile Ala Val Leu Pro Leu Thr Asp Gly
 1525 1530 1535

Leu Ala Asp Leu Arg Ala Met Gly Leu Leu Glu Ile Glu Lys Ala Glu
 1540 1545 1550
 Tyr Pro Arg Glu Ser Ser Val Val Asp Val Phe Arg Lys Gln Val Ala
 1555 1560 1565
 Ala His Pro His Ala Phe Ala Val Val Asp Ser Ala Ser Arg Leu Thr
 1570 1575 1580
 Tyr Ala Asp Leu Asp Arg Gln Ser Asp Gln Leu Ala Thr Trp Leu Gly
 1585 1590 1595 1600
 Arg Arg Asn Met Thr Ala Glu Thr Leu Val Gly Val Leu Ala Pro Arg
 1605 1610 1615
 Ser Cys Gln Thr Val Val Ala Ile Leu Gly Ile Leu Lys Ala Asn Leu
 1620 1625 1630
 Ala Tyr Leu Pro Leu Asp Val Asn Cys Pro Thr Ala Arg Leu Gln Thr
 1635 1640 1645
 Ile Leu Ser Thr Leu Asn Arg His Lys Leu Val Leu Leu Gly Ser Asn
 1650 1655 1660
 Ala Thr Thr Pro Asp Val Gln Ile Pro Asp Val Glu Leu Val Arg Ile
 1665 1670 1675 1680
 Ser Asp Ile Leu Asp Arg Pro Ile Asn Gly Gln Ala Lys Leu Asn Gly
 1685 1690 1695
 His Thr Lys Ser Asn Gly Tyr Ser Lys Pro Asn Gly Tyr Thr His Leu
 1700 1705 1710
 Lys Gly Tyr Ser Asn Leu Asn Gly Tyr Ser Lys Gln Asn Gly Tyr Ala
 1715 1720 1725
 Gln Leu Asn Gly His Arg Glu Arg Asn Asn Tyr Leu Asp Leu Asn Gly
 1730 1735 1740
 His Ser Leu Leu Asn Gly Asn Ser Asp Ile Thr Thr Ser Gly Pro Ser
 1745 1750 1755 1760
 Ala Thr Ser Leu Ala Tyr Val Ile Phe Thr Ser Gly Ser Thr Gly Lys
 1765 1770 1775
 Pro Lys Gly Val Met Val Glu His Arg Ser Ile Ile Arg Leu Ala Lys
 1780 1785 1790
 Lys Asn Arg Ile Ile Ser Arg Phe Pro Ser Val Ala Lys Val Ala His
 1795 1800 1805
 Leu Ser Asn Ile Ala Phe Asp Ala Ala Thr Trp Glu Met Phe Ala Ala
 1810 1815 1820
 Leu Leu Asn Gly Gly Thr Leu Val Cys Ile Asp Tyr Met Thr Thr Leu
 1825 1830 1835 1840

Asp Ser Lys Thr Leu Glu Ala Ala Phe Ala Arg Glu Gln Ile Asn Ala
 1845 1850 1855
 Ala Leu Leu Thr Pro Ala Leu Leu Lys Gln Cys Leu Ala Asn Ile Pro
 1860 1865 1870
 Thr Thr Leu Gly Arg Leu Ser Ala Leu Val Ile Gly Gly Asp Arg Leu
 1875 1880 1885
 Asp Gly Gln Asp Ala Ile Ala Ala His Ala Leu Val Gly Ala Gly Val
 1890 1895 1900
 Tyr Asn Ala Tyr Gly Pro Thr Glu Asn Gly Val Ile Ser Thr Ile Tyr
 1905 1910 1915 1920
 Asn Ile Thr Lys Asn Asp Ser Phe Ile Asn Gly Val Pro Ile Gly Cys
 1925 1930 1935
 Ala Ile Ser Asn Ser Gly Ala Tyr Ile Thr Asp Pro Asp Gln Gln Leu
 1940 1945 1950
 Val Pro Pro Gly Val Met Gly Glu Leu Val Val Thr Gly Asp Gly Leu
 1955 1960 1965
 Ala Arg Gly Tyr Thr Asp Pro Ala Leu Asp Ala Gly Arg Phe Val Gln
 1970 1975 1980
 Ile Met Ile Asn Asp Lys Ala Val Arg Ala Tyr Arg Thr Gly Asp Arg
 1985 1990 1995 2000
 Ala Arg Tyr Arg Val Gly Asp Gly Gln Ile Glu Phe Phe Gly Arg Met
 2005 2010 2015
 Asp Gln Gln Val Lys Ile Arg Gly His Arg Ile Glu Pro Ala Glu Val
 2020 2025 2030
 Glu Arg Ala Ile Leu Asp Gln Asp Ser Ala Arg Asp Ala Val Val Val
 2035 2040 2045
 Ile Arg His Gln Glu Gly Glu Glu Pro Glu Met Val Gly Phe Val Ala
 2050 2055 2060
 Thr His Gly Asp His Ser Ala Glu Gln Glu Glu Ala Asp Asp Gln Val
 2065 2070 2075 2080
 Glu Gly Trp Lys Asp Phe Phe Glu Ser Asn Thr Tyr Ala Asp Met Asp
 2085 2090 2095
 Thr Ile Gly Gln Ser Ala Ile Gly Asn Asp Phe Thr Gly Trp Thr Ser
 2100 2105 2110
 Met Tyr Asp Gly Ser Glu Ile Asn Lys Ala Glu Met Gln Glu Trp Leu
 2115 2120 2125
 Asp Asp Thr Met Arg Thr Leu Leu Asp Gly Gln Ala Pro Gly His Val
 2130 2135 2140

Leu Glu Ile Gly Thr Gly Ser Gly Met Val Leu Phe Asn Leu Gly Ala
 2145 2150 2155 2160
 Gly Leu Gln Ser Tyr Val Gly Leu Glu Pro Ser Arg Ser Ala Ala Thr
 2165 2170 2175
 Phe Val Thr Lys Ala Ile Asn Ser Thr Pro Ala Leu Ala Gly Lys Ala
 2180 2185 2190
 Glu Val His Val Gly Thr Ala Thr Asp Ile Asn Arg Leu Arg Gly Leu
 2195 2200 2205
 Arg Pro Asp Leu Val Val Leu Asn Ser Val Val Gln Tyr Phe Pro Thr
 2210 2215 2220
 Pro Glu Tyr Leu Leu Glu Val Val Glu Ser Leu Val Arg Ile Pro Gly
 2225 2230 2235 2240
 Val Lys Arg Val Val Phe Gly Asp Ile Arg Ser His Ala Thr Asn Arg
 2245 2250 2255
 His Phe Leu Ala Ala Arg Ala Leu His Ser Leu Gly Ser Lys Ala Thr
 2260 2265 2270
 Lys Asp Ala Ile Arg Gln Lys Met Thr Glu Met Glu Glu Arg Glu Glu
 2275 2280 2285
 Glu Leu Leu Val Asp Pro Ala Phe Phe Thr Ala Leu Leu Gln Gly Gln
 2290 2295 2300
 Leu Ala Asp Arg Ile Lys His Val Glu Ile Leu Pro Lys Asn Met Arg
 2305 2310 2315 2320
 Ala Thr Asn Glu Leu Ser Ala Tyr Arg Tyr Thr Ala Val Ile His Val
 2325 2330 2335
 Arg Gly Pro Glu Glu Gln Ser Arg Pro Val Tyr Pro Ile Gln Val Asn
 2340 2345 2350
 Asp Trp Ile Asp Phe Gln Ala Ser Arg Ile Asp Arg Arg Ala Leu Leu
 2355 2360 2365
 Arg Leu Leu Gln Arg Ser Ala Asp Ala Ala Thr Val Ala Val Ser Asn
 2370 2375 2380
 Ile Pro Tyr Ser Lys Thr Ile Val Glu Arg His Val Val Glu Ser Leu
 2385 2390 2395 2400
 Asp Asn Asn Asn Arg Glu Asn Thr His Arg Ala Pro Asp Gly Ala Ala
 2405 2410 2415
 Trp Ile Ser Ala Val Arg Ser Lys Ala Glu Arg Cys Thr Ser Leu Ser
 2420 2425 2430
 Val Thr Asp Leu Val Gln Leu Gly Glu Glu Ala Gly Phe Arg Val Glu
 2435 2440 2445

Val Ser Ala Ala Arg Gln Trp Ser Gln Ser Gly Ala Leu Asp Ala Val
 2450 2455 2460
 Phe His Arg Tyr Asn Leu Pro Thr Gln Ser Asn Ser Arg Val Leu Ile
 2465 2470 2475 2480
 Gln Phe Pro Thr Glu Asp Gly Gln Thr Arg Arg Ser Ala Thr Leu Thr
 2485 2490 2495
 Asn Arg Pro Leu Gln Arg Leu Gln Ser Arg Arg Phe Ala Ser Gln Ile
 2500 2505 2510
 Arg Glu Gln Leu Lys Ala Val Leu Pro Ser Tyr Met Ile Pro Ser Arg
 2515 2520 2525
 Ile Val Val Ile Asp Gln Met Pro Leu Asn Ala Asn Gly Lys Val Asp
 2530 2535 2540
 Arg Lys Glu Leu Thr Arg Arg Ala Gln Ile Ala Pro Lys Ser Gln Ala
 2545 2550 2555 2560
 Ala Pro Ala Lys Pro Val Lys Gln Val Asp Pro Phe Val Asn Leu Glu
 2565 2570 2575
 Ala Ile Leu Cys Glu Glu Phe Ala Glu Val Leu Gly Met Glu Val Gly
 2580 2585 2590
 Val Asn Asp His Phe Phe Gln Leu Gly Gly His Ser Leu Leu Ala Thr
 2595 2600 2605
 Lys Leu Val Ala Arg Leu Ser Arg Arg Leu Asn Gly Arg Val Ser Val
 2610 2615 2620
 Arg Asp Val Phe Asp Gln Pro Val Ile Ser Asp Leu Ala Val Thr Leu
 2625 2630 2635 2640
 Arg Gln Gly Leu Thr Leu Glu Asn Ala Ile Pro Ala Thr Pro Asp Ser
 2645 2650 2655
 Gly Tyr Trp Glu Gln Thr Met Ser Ala Pro Thr Thr Pro Ser Asp Asp
 2660 2665 2670
 Met Glu Ala Val Leu Cys Lys Glu Phe Ala Asp Val Leu Gly Val Glu
 2675 2680 2685
 Val Ser Ala Thr Asp Ser Phe Phe Asp Leu Gly Gly His Ser Leu Met
 2690 2695 2700
 Ala Thr Lys Leu Ala Ala Arg Ile Ser Arg Arg Leu Asp Val Pro Val
 2705 2710 2715 2720
 Ser Ile Lys Asp Ile Phe Asp His Ser Val Pro Leu Asn Leu Ala Arg
 2725 2730 2735
 Lys Ile Arg Leu Thr Gln Ala Lys Gly His Glu Ala Thr Asn Gly Val
 2740 2745 2750

Gln Ile Ala Asn Asp Ala Pro Phe Gln Leu Ile Ser Val Glu Asp Pro
 2755 2760 2765
 Glu Ile Phe Val Gln Arg Glu Ile Ala Pro Gln Leu Gln Cys Ser Pro
 2770 2775 2780
 Glu Thr Ile Leu Asp Val Tyr Pro Ala Thr Gln Met Gln Arg Val Phe
 2785 2790 2795 2800
 Leu Leu Asn Pro Val Thr Gly Lys Pro Arg Ser Pro Thr Pro Phe His
 2805 2810 2815
 Ile Asp Phe Pro Pro Asp Ala Asp Cys Ala Ser Leu Met Arg Ala Cys
 2820 2825 2830
 Ala Ser Leu Ala Lys His Phe Asp Ile Phe Arg Thr Val Phe Leu Glu
 2835 2840 2845
 Ala Arg Gly Glu Leu Tyr Gln Val Val Leu Lys His Val Asp Val Pro
 2850 2855 2860
 Ile Glu Met Leu Gln Thr Glu Glu Asn Ile Asn Ser Ala Thr Arg Ser
 2865 2870 2875 2880
 Phe Leu Asp Val Asp Ala Glu Lys Pro Ile Arg Leu Gly Gln Pro Leu
 2885 2890 2895
 Ile Arg Ile Ala Ile Leu Glu Lys Pro Gly Ser Thr Leu Arg Val Ile
 2900 2905 2910
 Leu Arg Leu Ser His Ala Leu Tyr Asp Gly Leu Ser Leu Glu His Ile
 2915 2920 2925
 Leu His Ser Leu His Ile Leu Phe Phe Gly Gly Ser Leu Pro Pro Pro
 2930 2935 2940
 Pro Lys Phe Ala Gly Tyr Met Gln His Val Ala Ser Ser Arg Arg Glu
 2945 2950 2955 2960
 Gly Tyr Asp Phe Trp Arg Ser Val Leu Arg Asp Ser Ser Met Thr Val
 2965 2970 2975
 Ile Lys Gly Asn Asn Asn Thr Thr Pro Pro Pro Pro Gln Gln Gln
 2980 2985 2990
 Ser Thr Pro Ser Gly Ala His His Ala Ser Lys Val Val Thr Ile Pro
 2995 3000 3005
 Thr Gln Ala Asn Thr Asp Ser Arg Ile Thr Arg Ala Thr Ile Phe Thr
 3010 3015 3020
 Thr Ala Cys Ala Leu Met Leu Ala Lys Glu Asp Asn Ser Ser Asp Val
 3025 3030 3035 3040
 Val Phe Gly Arg Thr Val Ser Gly Arg Gln Gly Leu Pro Leu Ala His
 3045 3050 3055

Gln Asn Val Ile Gly Pro Cys Leu Asn Gln Val Pro Val Arg Ala Arg
3060 3065 3070

Gly Leu Asn Arg Gly Thr Thr His His Arg Glu Leu Leu Arg Glu Met
3075 3080 3085

Gln Glu Gln Tyr Leu Asn Ser Leu Ala Phe Glu Thr Leu Gly Tyr Asp
3090 3095 3100

Glu Ile Lys Ala His Cys Thr Asp Trp Pro Asp Val Pro Ala Thr Ala
3105 3110 3115 3120

Ser Phe Gly Cys Cys Ile Val Tyr Gln Asn Phe Asp Ser His Pro Asp
3125 3130 3135

Ser Arg Val Glu Glu Gln Arg Leu Gln Ile Gly Val Leu Ser Arg Asn
3140 3145 3150

Tyr Glu Ala Ile Asn Glu Gly Leu Val His Asp Leu Val Ile Ala Gly
3155 3160 3165

Glu Ser Glu Pro Asp Gly Asp Asp Leu Arg Val Thr Val Val Ala Asn
3170 3175 3180

Arg Arg Leu Cys Asp Glu Glu Arg Leu Lys Arg Met Leu Glu Glu Leu
3185 3190 3195 3200

Cys Gly Asn Ile Arg Ala Leu Ala Leu Val
3205 3210

<210> 3
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Consensus Sequence

<400> 3
Trp Thr Ser Met Tyr Asp Gly
1 5

<210> 4
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Consensus Sequence

<400> 4
Val Val Gln Tyr Phe Pro Thr
1 5

<210> 5
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for Cyclic Depsipeptide Synthetase Gene

<220>
<221> base
<222> (6)
<223> n = a, g, c or t

<220>
<221> base
<222> (7)
<223> w = a or t

<220>
<221> base
<222> (8)
<223> s = g or c

<220>
<221> base
<222> (9)
<223> n = a, g, c or t

<220>
<221> base
<222> (15)
<223> y = t or c

<220>
<221> base
<222> (18)
<223> y = t or c

<400> 5
tggacnwsna tgtaygaygg

20

<210> 6
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for Cyclic Depsipeptide Synthetase Gene

<220>
<221> base
<222> (3)
<223> n = a, g, c or t

<220>
<221> base
<222> (6)
<223> r = g or a

<220>
<221> base
<222> (9)
<223> r = g or a

<220>
<221> base
<222> (12)
<223> y = t or c

<220>
<221> base
<222> (15)
<223> n = a, g, c or t

<220>
<221> base
<222> (18)
<223> n = a, g, c or t

<400> 6
gtnggraart aytgnacnac

20

<210> 7
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for Cyclic Depsipeptide Synthetase Gene

<400> 7
gcggaattaa ccctcactaa agggaacgaa

30

<210> 8
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for Cyclic Depsipeptide Synthetase Gene

<400> 8
gcgtaatacg actcactata gggcgaagaa

30

<210> 9
<211> 41

<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for Cyclic Depsipeptide Synthetase Gene

<400> 9
agcatcggat cctaacaatg ggcgttgagc agcaagccct a 41

<210> 10
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for Cyclic Depsipeptide Synthetase Gene

<400> 10
tttgcttcgt actcgggtcc t 21

<210> 11
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for Cyclic Depsipeptide Synthetase Gene

<400> 11
agcatcggat cctaacaatg tcaaacaatgg caccactccc ta 42

<210> 12
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for Cyclic Depsipeptide Synthetase Gene

<400> 12
gcatcgcgat actagagaag 20

<210> 13
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for Cyclic Depsipeptide

Synthetase Gene

<400> 13
agcatcgaat tcggatccct aaaccaacgc caaagcccga at 42

<210> 14
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for Abp1 Gene

<400> 14
ctcaaaccag gaactctttc 20

<210> 15
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for Abp1 Gene

<400> 15
gacatgtgga aaccacattt tg 22

<210> 16
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for Abp1 Gene

<400> 16
ggggaattcg tgggtggtga tatcatggc 29

<210> 17
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Primer for Abp1 Gene

<400> 17
gggggatcct tgatgggttt tggg 24

<210> 18
<211> 27
<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for Abp1 Gene

<400> 18

gggggatcct aaactcccat ctatagc

27

<210> 19

<211> 29

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for Abp1 Gene

<400> 19

gggtctagac gactcattgc agtgagtgg

29

<210> 20

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for Abp 1 Gene Promoter

<400> 20

tgatatgctg gagcttcct

20

<210> 21

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for Cyclic Depsipeptide Synthetase Gene

<400> 21

gcacaacctc tttccaggct

20